● PRINTER RUSH ●
(PTO ASSISTANCE)

Application :	09/683988	**Examiner :**	Silverman	**GAU :**	1754
From:	the	**Location:**	(IDC) FMF FDC	**Date:**	1/5/05
		Tracking #:	0604 1936	**Week Date:**	11/15/04

DOC CODE	DOC DATE	MISCELLANEOUS
☐ 1449		☐ Continuing Data
☐ IDS		☐ Foreign Priority
☐ CLM		☐ Document Legibility
☐ IIFW		☐ Fees
☐ SRFW		☐ Other
☐ DRW		
☐ OATH		
☐ 312		
☒ SPEC		

[RUSH] **MESSAGE:** All tables throughout are extremely small and very difficult to read. Please resend all tables in a normal font.

Thank you.

[XRUSH] **RESPONSE:** Corrected

See attachments

INITIALS: KP

NOTE: This form will be included as part of the official USPTO record, with the Response document coded as XRUSH.

REV 10/04

TABLE 1

	Solution	pH	Hydrogen Sulfide out, ppm (Time 5 minutes)
1	Water	5.4	400
2	+ 2% Iron oxide	4.8	210
3	+ 2% Iron oxide	4.9	200
4	+ 2% Iron oxide + 0.02% manganese oxide	5.3	75
5	+ 0.02% manganese oxide	4.0	400

TABLE 2

	Reaction Rate Constant	
% Metal Oxide Activator	With Copper Oxide(Cu_2O)	With Manganese Oxide(MnO_2)
0	0.6	0.8
0.8	0.105	0.105
2.4	0.134	0.122

TABLE 3

Reaction Rate Constant

	Reaction Rate Constant	
% Metal Oxide Activator	With Copper Oxide(Cu_2O)	With Manganese Oxide(MnO_2)
0	0.10	0.10
0.8	0.158	0.133
3.0	0.184	0.154

TABLE 4

Product	Bad Life, Days
100% Iron Oxide	128
95% Iron Oxide + 5% Manganese Oxide	144

TABLE 5

Component	% by Weight Manganese Dioxide	% by Weight Manganese Dioxide/ Cuprous Oxide Activator
Menthionlonite Clay	64.1	63.6
MnO_2	24.3	24.1
Water	11.6	11.5
CuO_2	0.0	0.8

TABLE 6

Formulation	Bad Life, Days
Manganese Dioxide ziose	29
Manganese Oxide/Cuprous Oxide Activator	40

TABLE 7

Test Conditions	
Temperature	70° F.
Flow Rate of Natural Gas Containing H_2S	5.41 liters/minute
Pressure	0.5 psig
Bed Height	7.9 feet (ft.)

TABLE 8

	Moderate H-S Contamination		Extreme H-S Contamination		
Gas Composition	H_2S No Oxygen Carbon Dioxide	500 ppm in H_2 14% by volume	H_2S Oxygen Carbon Dioxide	2200 ppm in H_2 4% by volume 14% by volume	
Test Results	Iron Oxide Only	1% by wt Copper Oxide	Iron Oxide Only	Copper Oxide	
Bed Depth for Complete H_2S Removal	Greater than 7.9 feet	Less than 4.7 feet	Greater than 7.9 feet	1.0% by wt Less than 2.7 feet	0.25% by wt Less than 3.7 feet

TABLE 9

	Iron Oxide Only	Iron Oxide with 1% by wt. Copper Oxide			
		At 4 ft. level		At 8 ft. level	
Hours in Test	At 4 ft. level H_2S	H_2S	Total Mercaptans	H_2S	Total Mercaptans
At Start	400 ppm*	0 ppm	0 ppm	0 ppm	0 ppm
6 Hr of Flow	*	0 ppm	35 ppm	0 ppm	0 ppm
21 Hr of Flow	*	0 ppm	40 ppm**	0 ppm	0 ppm

*The test was terminated due to the high amount of hydrogen sulfide, greater than 400 ppm, remaining in the headspace of the liquid hydrocarbon.
**Insignificant increase in mercaptan levels indicate maximum concentration has been reached.

TABLE 10

	Sample 1	Sample 2	Sample 3
Inlet H_2S (ppm)	25	22	24
Inlet Mercaptans (ppm)	20	20	20
First Port H_2S (ppm)	0	0	0
First Port Mercaptans (ppm)	0	0.5	0.75
Column 1 Temp (° F.)	85	68	84
Column 1 Press (psig)	410	410	400
Flow (ft^2/hr), actual	30	30	30

TABLE 11

	Sample 1	Sample 2	Sample 3
Inlet H_2S (ppm)	25	22	24
Inlet Mercaptans (ppm)	20	20	20
Inlet Carbonyl Sulfide (ppm)	0.025	0.025	0.025
First Part H_2S (ppm)	0	Broke through part 3 (15 ft)	Broke through part 3 (15 ft)
First Part Mercaptans (ppm)	0	Broke through part 3 (15 ft)	Broke through part 3 (15 ft)
First Part Carbonyl Sulfide (ppm)	0	Broke through part 2 (10 ft)	Broke through part 3 (15 ft)
Column 1 Temp (° F.)	54		
Column 1 press (psig)	410		
Flow (ft^3/hr) actual			

TABLE 12

		Mulch + 9% iron oxide					
Mulch		no additive		+0.9% Cu_2O		+0.09% MnO_2	
Contact sec.	$[H_2S]$ out ppm	Contact sec.	$[H_2S]$ out ppm	Contact sec	$[H_2S]$ out ppm	Contact sec	$[H_2S]$ out ppm
0	15	0	18	0	24	0	22
2 3	13	1 4	16	1 6	8	0 6	11
4 0	12	2 7	11	2 7	1.8	14	5 2
8 1	13	4 0	7	4 0	0 9	2 7	4 3
13 1	12	8 1	2 1	5 4	1 0	8 1	1 4
33 2	10	16.1	0.7	8.1	1 0	16 1	0 3
				16 1	0		